

WHAT IS CLAIMED IS:

1. A magnetic random access memory comprising:  
a memory cell which uses a magneto resistive  
effect to store data;

5 a first write line which is disposed right on the  
memory cell and which extends in a first direction;

a second write line which is disposed right under  
the memory cell and which extends in a second direction  
intersecting with the first direction;

10 a first yoke material with which an upper surface  
of the first write line is coated;

a second yoke material with which a side surface  
of the first write line is coated; and

a first barrier layer which is disposed between  
15 the first yoke material and first write line and  
between the second yoke material and first write line  
and which separates the first yoke material from the  
second yoke material.

2. A magnetic random access memory according to  
20 claim 1, wherein the first barrier layer is disposed on  
the side surface of the first write line.

3. A magnetic random access memory according to  
claim 1, wherein the first barrier layer is constituted  
of a conductive material.

25 4. A magnetic random access memory according to  
claim 1, wherein the first barrier layer is constituted  
of an insulating material.

5. A magnetic random access memory according to claim 1, wherein the first barrier layer has a function of preventing diffusion of atoms constituting the first and second yoke materials.

5           6. A magnetic random access memory according to claim 1, further comprising: a second barrier layer disposed between the upper surface of the first write line and the first yoke material.

7. A magnetic random access memory according to  
10 claim 6, wherein the second barrier layer is constituted of a conductive material.

8. A magnetic random access memory according to claim 6, wherein the second barrier layer is constituted of an insulating material.

15           9. A magnetic random access memory according to claim 6, wherein the second barrier layer has a function of preventing mutual diffusion of atoms constituting the first yoke material and atoms constituting the first write line.

20           10. A magnetic random access memory according to claim 1, further comprising: a second barrier layer with which the first yoke material, second yoke material, and first write line are coated.

11. A magnetic random access memory according to  
25 claim 10, wherein the second barrier layer is constituted of an insulating material.

12. A magnetic random access memory according to

claim 10, wherein the second barrier layer is constituted of a conductive material.

13. A magnetic random access memory according to claim 10, wherein the second barrier layer has a function of preventing diffusion of atoms constituting the first and second yoke materials.

14. A magnetic random access memory according to claim 1, further comprising: a mask layer which is disposed on the first yoke material and which is used as a mask to pattern the first write line.

15. A magnetic random access memory according to claim 1, wherein the first write line contacts the memory cell, and the second write line is apart from the memory cell.

16. A magnetic random access memory according to claim 1, wherein the second write line contacts the memory cell, and the first write line is apart from the memory cell.

17. A magnetic random access memory according to claim 1, wherein the first and second write lines both contact the memory cell.

18. A magnetic random access memory according to claim 1, wherein the memory cell is a TMR or GMR element.

19. A magnetic random access memory according to claim 1, wherein the first barrier layer has a thickness of at least 20 nm.

20. A magnetic random access memory according to claim 6, wherein the second barrier layer has a thickness of at least 20 nm.

21. A magnetic random access memory according to claim 10, wherein the second barrier layer has a thickness of at least 20 nm.

22. A magnetic random access memory comprising:  
a memory cell which uses a magneto resistive effect to store data;

10 a first write line which is disposed right on the memory cell and which extends in a first direction;

a second write line which is disposed right under the memory cell and which extends in a second direction intersecting with the first direction;

15 a first yoke material with which a lower surface of the second write line is coated;

a second yoke material with which a side surface of the second write line is coated; and

20 a first barrier layer which is disposed between the first yoke material and first write line and between the second yoke material and first write line and which separates the first yoke material from the second yoke material.

23. A magnetic random access memory according to claim 22, wherein the first barrier layer is disposed on the side surface of the second write line.

24. A magnetic random access memory according

to claim 22, wherein the first barrier layer is constituted of a conductive material.

25. A magnetic random access memory according to claim 22, wherein the first barrier layer is  
5 constituted of an insulating material.

26. A magnetic random access memory according to claim 22, wherein the first barrier layer has a function of preventing diffusion of atoms constituting the first and second yoke materials.

10 27. A magnetic random access memory according to claim 22, further comprising: a second barrier layer disposed between the lower surface of the second write line and the first yoke material.

28. A magnetic random access memory according to claim 27, wherein the second barrier layer is  
15 constituted of a conductive material.

29. A magnetic random access memory according to claim 27, wherein the second barrier layer is constituted of an insulating material.

20 30. A magnetic random access memory according to claim 27, wherein the second barrier layer has a function of preventing mutual diffusion of atoms constituting the first yoke material and atoms constituting the second write line.

25 31. A magnetic random access memory according to claim 22, further comprising: a second barrier layer with which the first yoke material, second yoke

material, and second write line are coated.

32. A magnetic random access memory according to claim 31, wherein the second barrier layer is constituted of an insulating material.

5        33. A magnetic random access memory according to claim 31, wherein the second barrier layer is constituted of a conductive material.

34. A magnetic random access memory according to claim 31, wherein the second barrier layer has a  
10        function of preventing diffusion of atoms constituting the first and second yoke materials.

35. A magnetic random access memory according to claim 22, further comprising: a mask layer which is disposed on the second write line and which is used as  
15        a mask to pattern the second write line.

36. A magnetic random access memory according to claim 22, wherein the first write line contacts the memory cell, and the second write line is apart from the memory cell.

20        37. A magnetic random access memory according to claim 22, wherein the second write line contacts the memory cell, and the first write line is apart from the memory cell.

38. A magnetic random access memory according to  
25        claim 22, wherein the first and second write lines both contact the memory cell.

39. A magnetic random access memory according to

claim 22, wherein the memory cell is a TMR or GMR element.

40. A magnetic random access memory according to claim 22, wherein the first barrier layer has  
5 a thickness of at least 20 nm.

41. A magnetic random access memory according to claim 27, wherein the second barrier layer has a thickness of at least 20 nm.

42. A magnetic random access memory according to claim 31, wherein the second barrier layer has  
10 a thickness of at least 20 nm.

43. A manufacturing method of a magnetic random access memory, comprising:

forming a first yoke material on an insulating  
15 layer on a semiconductor substrate;

forming a conductive material on the first yoke material;

patterning the conductive material and first yoke material;

20 forming a write line whose lower surface is coated with the first yoke material;

forming a first barrier layer with which the write line is coated;

forming a second yoke material with which the  
25 write line is coated on the first barrier layer;

etching the first barrier layer and second yoke material;

leaving the first barrier layer and second yoke material on the side surface of the write line; and

forming a memory cell which uses a magnetoresistive effect to store data right on the first write line.

44. A manufacturing method according to claim 43, further comprising: forming a second barrier layer between the first yoke material and conductive material.

45. A manufacturing method according to claim 43, further comprising: forming a second barrier layer with which the first yoke material, second yoke material, and write line are coated.

46. A manufacturing method according to claim 43, wherein the patterning is executed by RIE in which a photoresist is used as a mask.

47. A manufacturing method according to claim 43, wherein the patterning is executed by RIE in which a silicon insulating layer is used as a mask.

48. A manufacturing method according to claim 43, wherein the memory cell is formed in a position apart from the write line.

49. A manufacturing method according to claim 43, wherein the memory cell is formed in a position in contact with the write line.

50. A manufacturing method of a magnetic random access memory, comprising:



forming a memory cell which uses a magneto resistive effect to store data on an insulating layer on a semiconductor substrate;

forming a conductive material right on the memory  
5 cell;

forming a first yoke material on the conductive material;

patterning the first yoke material and conductive material;

10 forming a write line whose upper surface is coated with the first yoke material;

forming a first barrier layer with which the write line is coated;

forming a second yoke material with which the  
15 write line is coated on the first barrier layer;

etching the first barrier layer and second yoke material; and

leaving the first barrier layer and second yoke material on the side surface of the write line.

20 51. A manufacturing method according to claim 50, further comprising: forming a second barrier layer between the conductive material and first yoke material.

52. A manufacturing method according to claim 50,  
25 further comprising: forming a second barrier layer with which the first yoke material, second yoke material, and write line are coated.

53. A manufacturing method according to claim 50,  
wherein the patterning is executed by RIE in which  
a photoresist is used as a mask.

54. A manufacturing method according to claim 50,  
5 wherein the patterning is executed by RIE in which  
a silicon insulating layer is used as a mask.

55. A manufacturing method according to claim 50,  
wherein the memory cell is formed in a position apart  
from the write line.

10 56. A manufacturing method according to claim 50,  
wherein the memory cell is formed in a position in  
contact with the write line.